Site Investigation of
Pecor-Nissan Property
Shelburne Road
South Burlington, Vermont

Prepared For:
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1.0 Site History

1.1 Property History

The Pecor Nissan property is an approximately 435 foot long (north-south) and 300 foot wide (east-west) property located along Shelburne Road (Route 7) in South Burlington, Vermont near the South Burlington and Shelburne boundary. This land was used for farming or sat idle until Myrtle Lozon sold it to T.P. Motors in 1964. T.P. Motors constructed a sales and service building on this site and sold American Motors automobiles. In 1968, this property and improvements was sold to Mr. John A. DuBrul. Mr. DuBrul is President of The Automaster, which sold and serviced American Motors and then Mercedes, BMW and Honda automobiles at this property. In 1985, the northern half of this property was sold to Pecor Nissan, Inc., and in 1987, the southern half was acquired by Pecor-Nissan. This company (headed by Mr. Norm Pecor) is currently selling and servicing Nissan automobiles at this property.

Figures 1, 2, and 3 indicate the approximate location of the property on various maps. Figure 1 shows the property on the 1972 revision of the USGS 7.5 minute quadrangle labeled Burlington, VT (scale 1:24000 or 1 inch = 2000 feet). Figure 2 shows the property on sheet number 38 or the 1974 SCS soil survey of Chittenden County, Vermont (scale 1:15840 or 1 inch = 1320 feet). The photograph used for this map was taken either in 1967 or, more likely, 1962, as the T.P. Motors building is not apparent on this ~~photograph~~ map. Figure 3 shows the property on the 1978 Vermont Base Map orthophoto labeled South Burlington Shelburne 095213 (scale 1:1250 or 1 inch = 104 feet).

1.2 On Site Facilities

1.2.1 Buildings and Sewer

T.P. Motors had the existing two story sales building and one story service building constructed around 1964. The sales building contained a wash bay/service bay on the southeast bottom corner and two bathrooms draining to a septic tank and associated leach field. This septic tank and leach field was probably located to the south of the sales building and to the east and south of the service building. Municipal sewer facilities were provided around 1974 to this site, and it is suspected that at this time the septic tank may have been removed. The existing sewer line runs from the southeast corner of the sales building southeast under Route 7 to the Getty property where it hooks into the municipal system.

The service building contains one floor drain and sink at the western end of this building. The liquid waste from this area presumably drained directly to the ground west of the building (or conceivably into a wet well and then into the ground). Around the late 1970's, a Fiberglas tank was installed to receive this waste. This tank was pumped out approximately every two to three months. An overflow from this tank to the ground may also exist.

1.2.2 Utilities

Water service to this site was originally provided by a well located on land east of Route 7 and south of Allen Road. Champlain Water District provided a link to this area around 1968, so between this time and 1974 the site began to be serviced by this supply. The water line to this property follows the same general route as does the sewer line.

Electricity and telephone service is provided from a pole just south of the central entrance/exit to Route 7. These lines tie into the south east corner of the sales building, and then go overhead to the service building.

TANK REPLACEMENT

Heat is provided via a heating system fueled with #2 fuel oil. An existing underground storage tank just south of the center of the service building provides for fuel storage. This tank is believed to have been installed around the late 70's and was believed to have replaced a previous tank at this same location.

Storm water drainage originally was by overland flow over existing or man made topography and into existing surface drainage channels. The property generally slopes from east to west. The southern third of the property drains into a number of small surface swales. The middle third of the property drains into a noticeably eroded channel; this channel receives significant amounts of storm water run-off from Allen Road via a culvert underneath Route 7. The northern third of the property drains over the parking lot. All of this drainage eventually empties into a distinct channel along the property's western boundary. In the late 1970's, due to complaints of sheens visible on the grass and channel at the northwest corner of the property, the lower parking lot was contoured so that it drained towards a catch basin which emptied into a wet well filled with stone. This wet well presumably empties into the adjacent channel along the western property line.

1.2.3 Underground Storage Tanks

T.P. Motors had four underground storage tanks installed south of the sales building and east of the service building. Two 4000 gallon tanks containing gasoline and diesel fuel were located just south of the sales building. One 550 gallon tank containing #2 fuel oil and one 550 gallon tank containing waste oil were located just east of the service building.

4000 gal | gas
550 - #2 -
550 - waste oil |
Leakers

These tanks were removed under supervision of the Vermont Agency of Natural Resources on 30 December 1988. The two smaller tanks were observed to have leaks, the diesel tank appeared to be in fair condition, and the gasoline tank appeared to be in poor condition and leaking. Approximately 15 cubic yards of waste oil contaminated soil, 15 yards of #2 fuel oil contaminated soil, and 30 yards of gasoline or diesel contaminated soil was placed on polyethylene sheets near the northern property boundary. A perforated PVC pipe wrapped in burlap was placed in the excavated hole associated with the gasoline and diesel tanks and another such pipe was placed in the excavated hole associated with the #2 fuel oil and waste oil tanks. These holes were then backfilled.

UST? or surface mount

As mentioned before, a fuel oil tank lies just south of the center of the services building and a Fiberglas tank lies just west of the service building. A waste oil tank also lies just west of the service building and south of the Fiberglas tank; this tank was installed around the late 70's. A 1000 gallon tank used to contain diesel fuel was also installed just north of the western third of the service building around the late 70's. This tank was only in use for a couple of years during the late 70's fuel shortages.

1.2.4 Adjacent Properties

The Pecor-Nissan property is bounded on the south by the Colonial Mart Citgo. This gas station and convenience store was developed by Champlain Oil Co. of South Burlington, Vermont. This facility was constructed in 1980 and has five underground storage tanks: four 10,000 gallon tanks containing super unleaded, unleaded, regular and diesel fuel to the south of the convenience store; and one 4000 gallon tank containing kerosene to the north of the convenience store.

A site

The property is bounded on the east by Route 7 (Shelburne Road). The Getty Kwik Stop gas station and convenience store is just east of Route 7 and was developed by S.B. Collins of St. Albans, Vermont around 1977. This facility was constructed around 1977 and has eight underground storage tanks: five 10,000 gallon tanks containing super unleaded (1), unleaded (2), and regular (2) gasoline; two 4000 gallon tanks containing diesel and kerosene and; one tank containing #2 fuel oil. This facility replaced a previous Shell oil gasoline and service station operated from 1958 to 1976; several underground tanks were replaced when the Getty facility replaced the Shell facility. A tank for regular gasoline is being removed at this time.

The Pecor-Nissan property is bounded on the north by the Touchless Car Wash; this facility was constructed on previously vacant land around 1987. The Pecor-Nissan property is bounded on the south by Wickes Lumber, which was constructed around the mid 1970's.

I THOUGHT COLONIAL MART BOUNDS PECOR TO THE SOUTH

2.0 Field Investigations

2.1 Previous Studies

This property lies on east to west sloping land approximately 1500 feet east of Lake Champlain. The soils on this property were mapped by the SCS and were classified into two groups: Belgrade and Eldridge soils, 3 to 8 percent slopes (BIB) on the upper portion of the property), and; Enosburg and Whately soils, 3 to 8 percent slopes (EwB) on the lower portion of the property. These soils are typically described as silty or very fine sandy loams, with the BIB soils being well drained and the EwB soils being poorly drained. A description of these soils from the SCS soil survey is found in Appendix A.

2.2 Underground Storage Tank Removal

As mentioned previously, two PVC monitoring pipes were installed on 30 December 1988 in the excavated holes where four underground storage tanks had been removed. On 8 February 1989, personnel from Vermont's Agency of Natural Resources observed that water in the PVC pipe in the hole associated with the gas and oil (gas-1) had no product (floating gasoline or diesel fuel); water in the PVC pipe in the hole associated with the #2 fuel oil and waste oil (wo-1) was clear with a slight surface sheen. On 14 March 1989, the contents of these wells were observed at Aquatec. The air in the wells and the water did not exhibit petroleum type odors and the water in the wells did not exhibit a surface sheen or product layer. Depth to water was about 6.5 feet below grade in gas-1 and 4.5 feet below grade in wo-1.

2.3 Soil Borings/Monitoring Well Installation and Observations

Aquatec retained East Coast Drilling and Boring to do soil borings and install monitoring wells on the Pecor-Nissan property. On 6 March 1989, Roland Luxenberg of Aquatec supervised the installation of MW-1 (just off the southwest corner of the upper parking lot near the property boundary with Colonial Mart Citgo) and MW-2 (just to the north of the central entrance/exit to Route 7). On 7 March, Brett Cox supervised the installation of MW-3 (just west of the northwest corner of the lower parking lot) and MW-4 (about 80 feet west of the sales building and 40 feet north of the service building). The soil boring log for these borings and subsequent monitoring well installations are found in Appendix B.

The soil types observed during this drilling agreed with the SCS observations. A tin can encountered in the surface soil at MW-4 indicated that some soil grading had probably been performed in the lower parking lot area. The excavated soils at MW-1, MW-2, and MW-3 did not appear to have any petroleum odor, nor did they elicit a response with an HNU photoionization detector. Soils from MW-4 had a noticeable petroleum odor (probably gasoline) and caused a high response on the HNU (reading of 200 ppm as benzene). Dense clay was encountered at approximately ten feet below grade at MW-4 and this clay did not have an apparent petroleum odor.

On 14 March 1989, these wells were observed for air and ground water odor and water levels. No petroleum odors were apparent in this stagnant air in MW-1, MW-2, and MW-3 or the water from MW-2 or MW-3; MW-1 was dry. Depth to water below grade was 11.4 feet at MW-2 and 8.3 feet at MW-3; depth to the bottom of well below grade was 18.5 feet at MW-1. A strong odor of petroleum was apparent from the water in MW-4, but no product was observed; depth to water below grade was 6.3 feet.

2.4 Miscellaneous Field Observations

On 14 March 1989, Roland Luxenberg and Brett Cox conducted a walk through of the Pecor Nissan property. Two partially buried tanks were observed just west of the southwest corner of the upper parking lot; the larger tank was somewhat crushed. The Fiberglas tank west of the service building was mostly full of liquid which looked and smelled of radiator fluid and appeared to also contain an oily substance. The soil near the waste oil tank just north of this Fiberglas had surface staining probably resulting from oil spillage.

A small fenced solid waste collection area between the service building and the Fiberglas/waste oil tanks contained numerous empty cans of undercoating and lubricating materials and a variety of scrap auto parts. Snow and ice in front of the second most western service bay showed evidence of radiator fluid staining.

3.0 Future Investigation/Remediation

There exists the possibility of release of hazardous materials to soils and ground water from the old septic system, from the existing waste oil and fuel oil tanks, the floor drain/Fiberglas tank serving the west end of the service building. Therefore, an additional soil boring and monitoring well installation down gradient of each location is recommended. Alternatively, soil cores from these sites could be extracted and qualitatively screened (odors, staining, HNU readings).

Due to the existing subsurface gasoline contamination evidenced in MW-4, analysis of ground water in this well should be conducted to quantify existing contamination. Observations of ground water levels, visual appearance, and odor should be continued at all wells at least every three months for one year.

did they bail wells & hit sand.
1) free
2) sheens

Based on existing state remediation guidelines, past observations, and down gradient property owners and natural resources, remediation of existing known contamination may not be necessary. If remediation is deemed necessary, additional borings should be conducted in the lower parking lot area to delineate the extent of contamination. If product is not observed in MW-4 or at any additional observation wells, but remediation is implemented, then a soil venting and carbon adsorption system would be suitable at this site. If product is observed or ground water contamination is deemed unacceptably high, a product recovery/ground water remediation system should be installed.

Soil venting in clay?

SILTY SAND
FINE SANDY LOAM

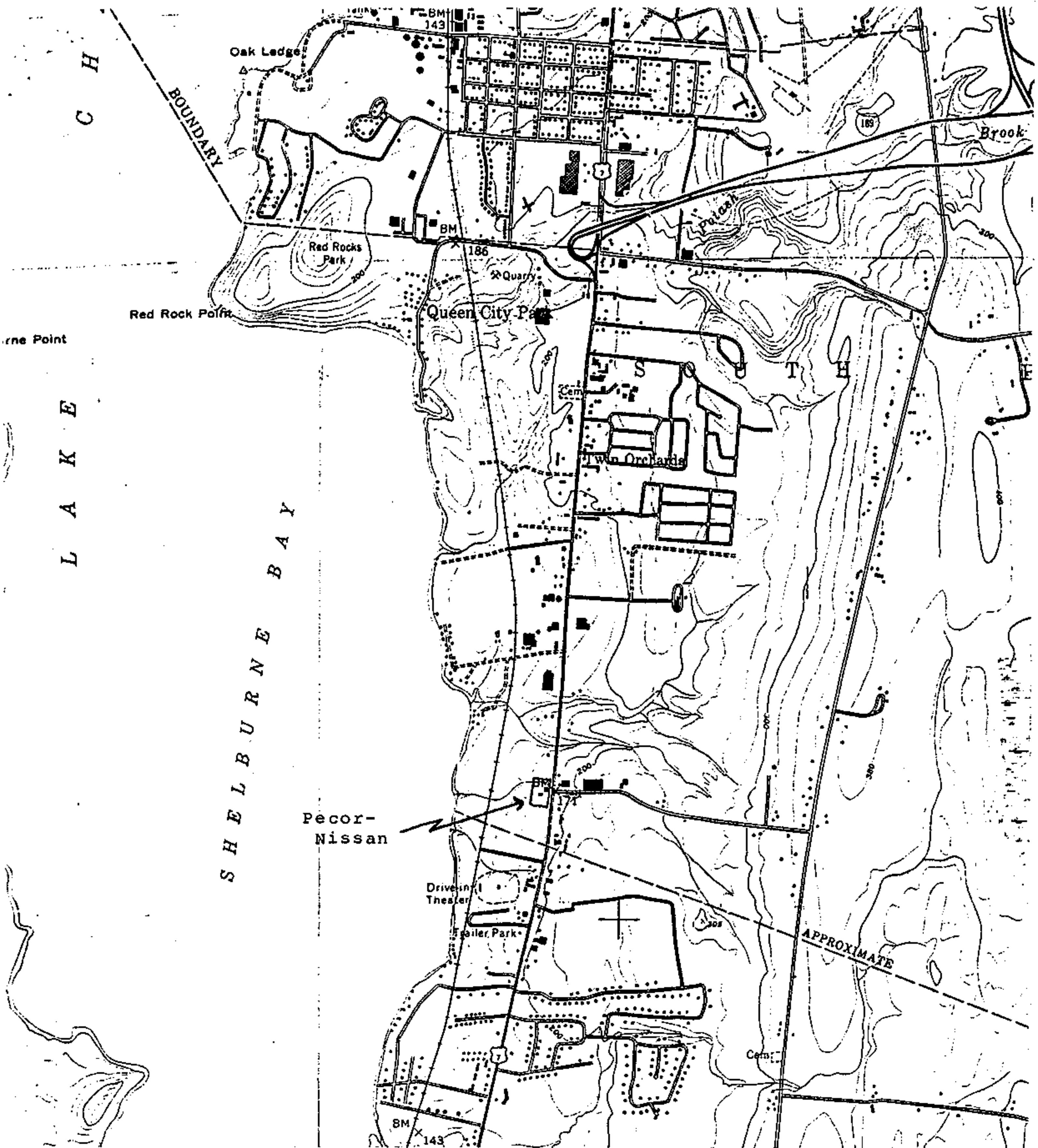

Figure 1 Location of Pecor-Nissan property on USGS 7.5' Quadrangle (Burlington, scale 1:24000)

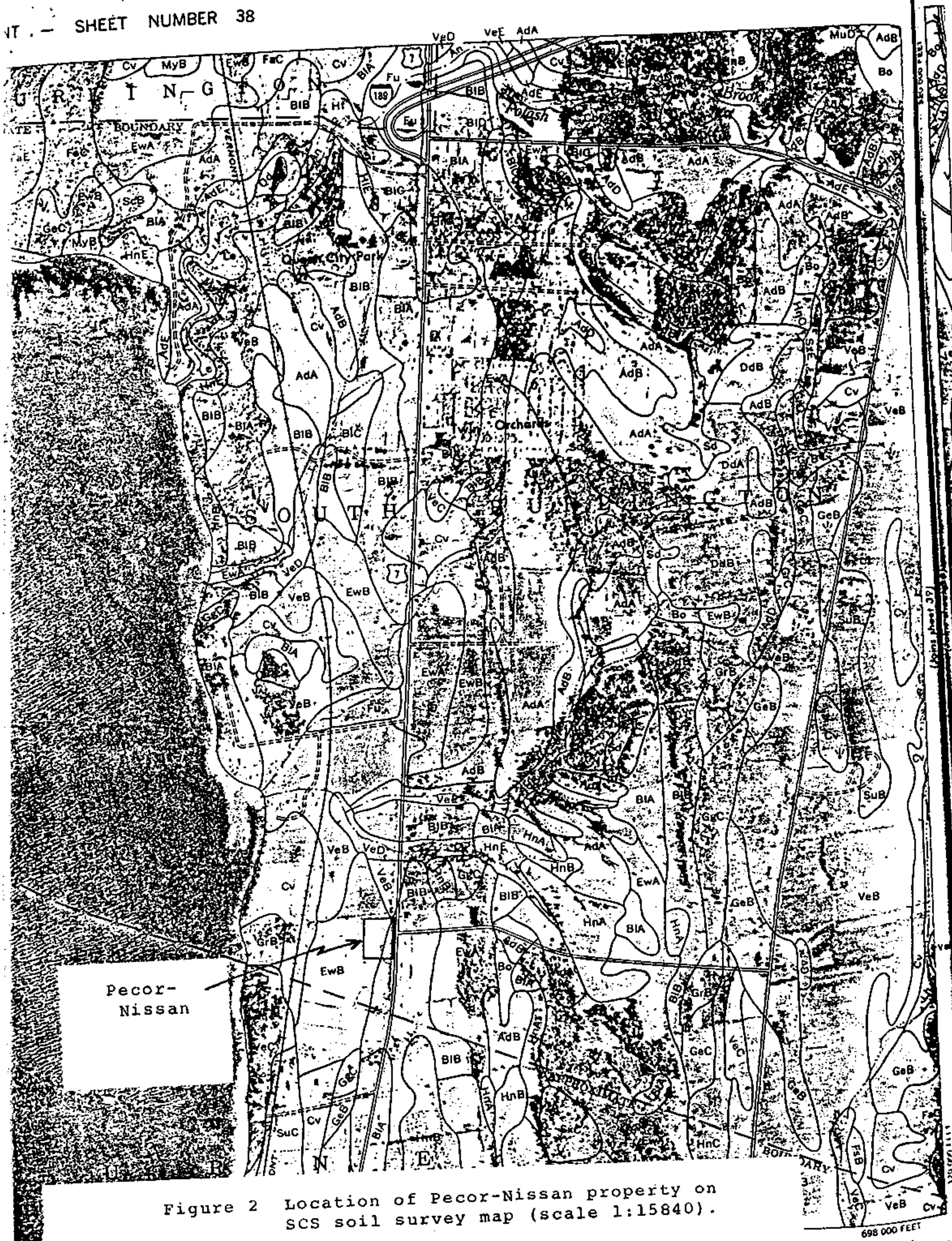

Figure 2 Location of Pecor-Nissan property on SCS soil survey map (scale 1:15840).

APPENDIX A

to 50 acres in size. Slopes range from 50 feet in length r less in natural drainage channels to 400 feet in length n concave areas.

Included with this soil in mapping are small areas of Deerfield, Duane, Scarboro, Whately, and Enosburg oils. The Deerfield and Duane soils are on slight rises, nd the Scarboro soils are in depressions. In a few included areas, soils are 5 percent to more than 35 percent obbles and cobblestones at a depth of 10 to 40 inches. Also included are soils that have thin layers of finer extured material in the subsoil and substratum and soils at have a calcareous substratum. In a few areas the urface layer is loam, sandy loam, fine sand, sand, loamy ne sand, or loamy sand.

This soil is used mainly for hay, pasture, and trees. A nall acreage is idle or is used for corn grown for silage.

Surface runoff is slow. Unless a drainage system is stalled, the water fluctuates from near the soil surface uring the wetter part of the year to a depth below 3 feet uring the drier part. Because this soil has a seasonal gh water table, especially late in fall and in spring, it so wet that growth of plants and operation of farm achinery are hindered. Overdrainage of this soil results . droughtiness. The soil is susceptible to soil blowing here not vegetated. The hazard of water erosion is ight on the steeper slopes where cultivated crops are own and where a plant cover is lacking. This soil has vere limitations for many nonfarm uses, especially those or which wetness is a consideration. (Capability unit IVw-5; woodland suitability group 4w1)

Beaches

Beaches (Be) include the sandy and gravelly beaches of ake Champlain in the towns of Charlotte, Colchester, nd Milton and the city of Burlington. In back of these eaches are the sand dunes beach area of Colchester, orthwest and southeast of Barney Point. In this area amps have been built on the dune sand above normal ater level. Beaches occupy a very small acreage in the ounty. Most of the beaches are covered by the waters of ake Champlain early in spring. Contents of sand and ravel are variable. The thickness of the sand over clay r other materials ranges from 6 inches to more than feet. Most of the beaches have a slope of more than percent. (Capability unit VIIIs-2; woodland suitability roup not assigned)

Belgrade Series

The Belgrade series consists of deep, nearly level to moderately steep, moderately well drained soils that are oamy throughout their profile. These soils are mostly in ne central part of the county near the Winooski and Browns Rivers. They developed in silt loam or very fine andy loam glaciolacustrine material that is deeper than feet. In a few places beneath this medium-textured aterial, the texture is sandy below a depth of 4 feet.

A representative profile of a Belgrade soil has a darkrown very fine sandy loam surface layer about 7 inches hick. The subsoil is 5 inches of strong-brown very fine andy loam over 11 inches of yellowish-brown very ne sandy loam. The underlying material is light brownish-gray very fine sandy loam in the upper part and is mottled with dark reddish brown and yellowish red. A layer of grayish-brown silt loam about 4 inches thick occurs at a depth of about 31 inches. It is underlain by a thick layer of pale-brown very fine sandy loam. Many prominent yellowish-red mottles are throughout the soil mass.

Belgrade soils have a moderately high available moisture capacity and high natural fertility. They are moderately slowly permeable. These soils are slow to warm in the spring. A seasonal high water table keeps the soils wet from late in fall to early in spring. These soils puddle if worked when wet and crust when they dry. Farm machinery is easily bogged down in these soils when they are wet. Belgrade soils have a low shrink-swell potential.

The Belgrade soils are mainly used for hay, pasture, and corn grown for silage. A few areas are idle.

In Chittenden County, the Belgrade soils were not mapped separately. They were mapped with Eldridge soils and with Munson soils in undifferentiated units. The Eldridge soils are described under the Eldridge series. The undifferentiated unit of Munson and Belgrade soils is described under the Munson series.

A representative profile of a Belgrade very fine sandy loam in an idle field in the town of Shelburne, one-half mile east of Shelburne Museum:

Ap—0 to 7 inches, dark-brown (7.5YR 3/2) very fine sandy loam; weak, very fine, granular structure; very friable; many roots; slightly acid; abrupt, smooth boundary.

B21ir—7 to 12 inches, strong-brown (7.5YR 5/6) very fine sandy loam; massive; very friable; common roots; neutral; abrupt, smooth boundary.

B22ir—12 to 23 inches, yellowish-brown (10YR 5/4) very fine sandy loam; massive; very friable; few roots; neutral; abrupt, smooth boundary.

C1—23 to 31 inches, light brownish-gray (10YR 6/2) very fine sandy loam; many, coarse, prominent, dark reddish-brown (5YR 3/4), yellowish-red (5YR 4/8), and dark yellowish-brown (10YR 4/4) mottles; massive, but separates to weak, moderate, angular blocky structure; friable; few roots; neutral; abrupt, smooth boundary.

C2—31 to 35 inches, grayish-brown (10YR 5/2) silt loam; many, medium and coarse, prominent, yellowish-red (5YR 4/6 and 5/8) and dark yellowish-brown (10YR 4/4) mottles; weak, thick, platy structure; friable; few roots; slightly acid; abrupt, smooth boundary.

C3—35 to 60 inches, pale-brown (10YR 6/3) very fine sandy loam; many, medium and coarse, prominent, dark reddish-brown (5YR 3/4) and yellowish-red (5YR 4/8 and 5/8) mottles; massive; very friable; neutral.

The solum ranges from 20 to 30 inches in thickness. Depth to mottles ranges from 12 to 23 inches.

The A horizon has a hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 or 3. It is silt loam or very fine sandy loam. The reaction of the A horizon ranges from strongly acid to slightly acid.

The upper part of the B horizon has a hue of 7.5YR or 10YR, value of 4 or 5, and chromas of 4 to 6. The lower part of the B horizon has a hue of 10YR or 2.5Y, values of 4 to 6, and chromas of 2 to 4. If mottles occur in the lower part of the B horizon, they are distinct to prominent. The B horizon ranges from very fine sandy loam to silt loam. The reaction of the B horizon ranges from medium acid to neutral.

The C horizons have a hue of 10YR or 2.5Y in most places. Values range from 4 to 6, and chromas from 2 to 4. The mottles in the C horizons are distinct or prominent. The C horizons are very fine sandy loam or silt loam. Reaction ranges from medium acid to neutral.

Belgrade soils in this county are less acid than the defined range for the series, but this difference does not alter their usefulness and behavior.

In most places Belgrade soils are near the somewhat poorly drained Munson and Raynham soils and the well-drained Hinesburg and Hartland soils. In places the Belgrade soils have less clay in the substratum than Munson soils. The upper part of the subsoil of the Belgrade soils is redder than that of the Raynham soils. The Belgrade soils are more silty in the upper part of the soil profile than the Hinesburg soils. Mottles occur in the lower part of the subsoil of the Belgrade soils but are lacking in the Hartland soils.

Belgrade and Eldridge soils, 0 to 3 percent slopes (BlA).—This is an undifferentiated group of Belgrade and Eldridge soils. Any given area may consist of Belgrade soils, Eldridge soils, or soils of both series. These soils occupy irregularly shaped areas 2 to 80 acres in size. Generally, 10 to 15 acres is the most common size. The profiles of these soils are the ones described as representative for their respective series.

Included with these soils in mapping are small areas of wetter soils in slight depressions. In a few places where the soils of this unit occur near the Groton and Stetson soils, gravel occurs at a depth of 4 feet or more. Also included are areas of soils that have thin layers of material in the subsoil and substratum that is coarser textured than that in corresponding layers in the Belgrade and Eldridge soils. In unvegetated areas that have been exposed to the wind, the surface layer of the Eldridge soils has been thinned by soil blowing. In a few areas mapped at lower elevations, the material underlying the sandy material is clay instead of very fine sandy loam and silt loam. The surface layer in a few areas is silt loam in the Belgrade soils and fine sandy loam or fine sand in the Eldridge soils.

This mapping unit is used mainly for hay and corn silage. A few areas are in pasture or woodlots or are idle.

Surface runoff is slow. Because this mapping unit contains more inclusions of wetter soils than undifferentiated groups of steeper Belgrade and Eldridge soils, tillage is delayed longer in spring and following heavy rains. The wetter soils in drainageways and depressions dry more slowly, and if they are tilled when wet, their finer textured surface layer is puddled and compacted. If the soils of this mapping unit have not been artificially drained, the water table is near the soil surface during the wetter part of the year and falls to a depth below 3 feet during the drier part. Because these soils have a high water table late in fall and early in spring, they are so wet that the growth of plants and operation of farm machinery are hindered. The hazard of water erosion is very slight, even in unvegetated areas where cultivated crops are grown. The Eldridge soils are subject to soil blowing when they are unvegetated or when the intertilled crop is too small to protect the soil. If Eldridge soils are overdrained, they are droughty. The Belgrade and Eldridge soils have limitations for many nonfarm uses, especially those that are affected by wetness and permeability. (Belgrade soils, capability unit IIw–3, woodland suitability group 3o1; Eldridge soils, capability unit IIw–4, woodland suitability group 4o4)

Belgrade and Eldridge soils, 3 to 8 percent slopes (BlB).—These soils occupy irregularly shaped areas that range from 2 to 35 acres in size but most commonly are 5 to 10 acres. An individual area may be all Belgrade soils, all Eldridge soils, or some of both.

Included with these soils in mapping are wetter soils in the slight depressions. Gravel is at a depth of 4 feet or more in a few places where the soils of this unit occur near the Groton and Stetson soils. Also included in mapping are soils that have thin layers of material in the subsoil and substratum that is coarser textured than that in corresponding layers described as representative. Other included areas consist of eroded Eldridge soils that have a thinner surface layer. At lower elevations in the county, a few mapped areas have clay instead of very fine sandy loam and silt loam under the sandy material. The Belgrade soils have a thinner combined surface layer and subsoil in areas that have been eroded. In a few places the surface layer is silt loam in the Belgrade soils and fine sandy loam or fine sand in the Eldridge soils.

These soils are used mainly for hay and corn silage. A few areas are in pasture or woodlots, or they are idle.

Surface runoff is medium. Since this mapping unit has fewer inclusions of wetter soils than units of more nearly level Belgrade and Eldridge soils, tillage is not delayed so long in spring and following heavy rains. Where the soils of this unit have not been artificially drained, the water table is near the soil surface during the wetter part of the year and falls to a depth below 3 feet during the drier part. Because these soils have a high water table late in fall and early in spring, they are so wet that the growth of plants and operation of farm machinery are hindered. The hazard of water erosion is slight, even in unvegetated areas where cultivated crops are grown. Soil blowing is a hazard on the Eldridge soils where the soil is not protected by a plant cover or where an intertilled crop is too small to protect the soil. Where overdrained, the Eldridge soils are droughty. The Belgrade and Eldridge soils have limitations for many nonfarm uses, especially those that are affected by wetness and slope. (Belgrade soils, capability unit IIw–3, woodland suitability group 3o1; Eldridge soils, capability unit IIw–4, woodland suitability group 4o4)

Belgrade and Eldridge soils, 8 to 15 percent slopes (BlC).—These soils have concave slopes and occupy long, narrow areas 2 to 5 acres in size. Some areas of the mapping unit are only Belgrade soils, others are only Eldridge soils, and still others are both.

Included with these soils in mapping are wetter soils in drainageways or around springs. Also included are small areas of soils that have slopes of less than 8 percent or of more than 15 percent. In a few places mapped near the Groton and Stetson soils, gravel occurs at depths of 4 feet or more. Also included are soils that have thin layers of material in the subsoil and substratum that is coarser textured than that in corresponding layers of the representative profile. The combined surface layer and subsoil are thinner in eroded included areas. At lower elevations in the county, a few areas of included soils have clay instead of the very fine sandy loam or silt loam under the sandy material. In a few areas the surface layer is a silt loam in the Belgrade soils and fine sandy loam or fine sand in the Eldridge soils.

These soils are used mainly for hay. In the less sloping areas, corn is grown for silage. A few areas are in pasture or woodlots, or they are idle.

IIIC2—18 to 60 inches, gray (5Y 5/1) silt loam; many, fine to coarse, prominent, dark-brown (7.5YR 4/4), yellowish-brown (10YR 5/6), dark grayish-brown (2.5Y 4/2), and olive-brown (2.5Y 4/4) mottles; weak, medium, platy structure; friable; few roots to depth of 25 inches; neutral.

The solum ranges from 12 to 28 inches in thickness. Depth to the contrasting finer textured material ranges from 16 inches to 40 inches. Coarse fragments are less than 1.0 percent, by volume.

The A horizon has a hue of 10YR, value of 3, and chroma of 2 or 3. It is medium acid to neutral.

The B horizon is 7.5YR to 2.5Y in hue, 4 or 5 in value, and 3 to 6 in chroma. It ranges from loamy fine sand to sand. It is mottled in the lower part. The B horizon ranges from medium acid to neutral.

The C horizon is 10YR to 5Y in hue, 4 or 5 in value, and 1 to 3 in chroma. It is silt loam or very fine sandy loam.

In most places the Eldridge soils occur near the Munson, Raynham, Belgrade, Deerfield, Windsor, and Hinesburg soils. Eldridge soils are more sandy in the solum than the Munson, Raynham, and Belgrade soils. They have mottling in the lower part of the subsoil and the Windsor soils do not. Eldridge soils are mottled closer to the surface than the Hinesburg soils. The C horizon of Eldridge soils is more silty or loamy than that of the Deerfield and Windsor soils.

Enosburg Series

The Enosburg series consists of soils that are deep and poorly drained. These soils formed in sandy deltas, beaches, and terraces underlain by medium-textured lacustrine materials at a depth of less than 40 inches. They are level to gently sloping. These soils are mainly in the northern half of the Champlain Valley. Areas start in the town of South Burlington and continue northward to the Franklin County line.

A representative Enosburg soil in formerly cultivated woodland has a very dark grayish-brown loamy sand surface layer about 8 inches thick. The surface layer is strongly acid. The upper part of the substratum starts at a depth of about 8 inches and continues to 32 inches below the soil surface. It is a very friable to loose, olive-gray and grayish-brown, strongly acid to slightly acid sand and coarse sand that is mottled. The lower part of the substratum extends to a depth of 60 inches. It is friable, gray, slightly acid silt that is mottled.

The Enosburg soils have low natural fertility and a moderately low available moisture capacity. Their permeability is rapid in the sandy materials and moderately slow in the silty materials. A normally high water table keeps these soils wet from early in fall to late in spring. The mottles indicate that these soils have a fluctuating water table that is less than 12 inches below the soil surface during the wettest part of the year and is below 24 inches during the driest part. The moderately slowly permeable silty layer restricts internal drainage. During the wetter part of the year, following rains with above normal precipitation, water ponds for short periods on the soil surface in the nearly level areas. Crops in the ponded areas are subject to drowning. The normally high water table restricts plant rooting depth. Tillage operations, weed control, and harvesting crops are hampered unless the water table is lowered.

These soils are slow to warm in the spring. Artificial drainage is needed for good crop growth. The finer textured layers hold a significant amount of moisture available for the plants, and they also keep the sandy material above them moist. They give an otherwise droughty soil a higher available moisture capacity. During the usually dry summer, crops are affected by a lack of water. These soils are easily tilled and can be cultivated throughout a wide range of moisture without clodding or crusting. Because of their position, they receive runoff water from higher adjacent soils in addition to that received in precipitation. Shrink-swell potential is low.

The Enosburg soils are used mainly for hay and pasture. A few areas are in trees, are idle, or are used for corn.

In Chittenden County, the Enosburg soils were not mapped separately but were mapped with Whately soils in undifferentiated groups. The Whately soils are described under the Whately series.

Representative profile of a wooded Enosburg loamy sand, about 4,000 feet directly east of Lamoille River Bridge where U.S. Highway No. 2 crosses the bridge in a north-south direction:

Ap—0 to 8 inches, very dark grayish-brown (10YR 3/2) loamy sand; common, fine, prominent, brown (7.5YR 4/4) mottles; clods separate to weak, fine and medium, granular structure; very friable; many roots; dark reddish-brown (2.5YR 3/4) iron-manganese concretions 5 to 40 millimeters in size; 5 percent coarse fragments; strongly acid; abrupt, smooth boundary.

C1g—8 to 16 inches, olive-gray (5Y 5/2) sand; common, fine, prominent, yellowish-brown (10YR 5/4 and 5/6), brown (7.5YR 4/4), and reddish brown (5YR 4/4) mottles; weak, fine, granular structure; very friable; common roots; dark reddish-brown (2.5YR 3/4) iron-manganese concretions 5 to 40 millimeters in size; 5 percent coarse fragments; strongly acid; clear, wavy boundary.

C2—16 to 32 inches, grayish-brown (10YR 5/2) coarse sand; many, fine and medium, prominent, yellowish brown (10YR 5/4 and 5/6), brown (7.5YR 4/4), and reddish-brown (5YR 4/4) mottles; single grain; loose; few roots; 7 percent coarse fragments; medium acid in the upper part and slightly acid in the lower part; abrupt, smooth boundary.

IIC3g—32 to 60 inches, gray (N 5/0) silt; many, fine to coarse, prominent, light olive-brown (2.5Y 5/4 and 5/6) mottles; massive separating to weak, medium to very coarse, platy structure; friable; few roots; no coarse fragments; slightly acid.

Depth to contrasting finer textured materials ranges from more than 16 inches to 40 inches. Coarse fragments are less than 10 percent, by volume.

The A horizon is 10YR in hue, 2 or 3 in value, and 1 or 2 in chroma. It ranges from strongly acid to neutral.

The sandy C2 horizon is 10YR to 5Y in hue, 4 or 5 in value, and 1 to 2 in chroma. Mottles are distinct or prominent. The C2 horizon is coarse sand to loamy fine sand. It ranges from strongly acid to neutral.

The loamy IIC3 horizon is 10YR to 5Y in hue, 3 to 5 in value, and 1 to 2 in chroma or colors are neutral and have a value of 4 or 5. Mottles are distinct or prominent. The IIC3 horizon is silt, silt loam, or very fine sandy loam. It is slightly acid or neutral.

Most areas of Enosburg soils are near the Belgrade, Eldridge, Hinesburg, Deerfield, and Windsor soils. Enosburg soils are more sandy in the upper part of the profile than the Belgrade soils and are lower in the landscape. The Enosburg soils are the wetter associates of the Eldridge and Hinesburg soils. The material in the lower part of the subsoil of Enosburg soils is finer textured than that of the Deerfield and Windsor soils. In most places Enosburg soils are lower in the landscape than Deerfield and Windsor soils.

Enosburg and Whately soils, 0 to 3 percent slopes (EwA).—This is an undifferentiated group of Enosburg

APPENDIX B

East Coast Drilling & Boring of Vermont, Inc.

P.O. BOX 441 • DERBY, VT 05829

TO: Aquatec, Inc.
PROJECT NAME: Pecor-Nissan
REPORT SENT TO: Client
SAMPLES SENT TO: Taken at Site

ADDRESS: S. Burlington, VT
LOCATION: S. Burlington, VT
PROJ. NO.:
OUR JOB NO.: 89V-117

Bit # ______ Ftg. ______
Bit # ______ Ftg. ______

SHEET 1 OF 1
DATE 3-14-89
HOLE NO. MW-2
LINE & STA.
OFFSET

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR.
At 13.0' after 0 Hours	Type	HSA	SS	
	Size I.D.	4 1/4"	1 3/8'	
At ______ after ______ Hours	Hammer Wt.		140 lb	BIT
	Hammer Fall		30"	

SURFACE ELEV.
DATE STARTED 3-6-89
DATE COMPL. 3-6-89
BORING FOREMAN Pete Place
INSPECTOR Luxenberg
SOILS ENGR.

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From – To	Type of Sample	Blows per 6" on Sampler From 0-6	6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
		5.0'-7.0'	D	2	2	3 2	Moist M.Stiff		Gray Brown Clay Silt, some fine medium Sand, trace Gravel.	1	2.0'	0.2'
								10.0'				
		10.0'-12.0'	D	3	5	7 8	Moist Stiff		Brown Silty Clay, trace Sand, fine very fine , trace Pebble.	2	2.0'	1.1'
		15.0'-17.0'	D	11	18	20 7	Wet V.Stiff		Brown Silty fine medium Sand, trace Clay, some Cobbles.	3	2.0'	1.1'
								20.0'				
		20.0'-20.9'	D	25	100/.4		Dry Hard	20.9'	Dark Gray Silty medium fine Sand.	4	0.9'	0.4'
									Bottom of Boring at 20.9' Installed 2" PVC Monitor Well at 19.0' 10.0' Screen 10.0' Riser 6 bags Ottawa Sand 100 lb Bentonite Pellets 1-Threaded Plug 1-Vented Cap			
								no way				

GROUND SURFACE TO 20.0' USED HSA "CASING: THEN Sampled to 20.9'

Sample Type	Proportions Used	140 lb Wt. x 30" fall on 2" O.D. Sampler		SUMMARY
D = Dry C = Cored W = Washed	trace 0 to 10%	Cohesionless Density	Cohesive Consistency	Earth Boring 20.9'
UP = Undisturbed Piston	little 10 to 20%	0-10 Loose	0-4 Soft 30 + Hard	Rock Coring
TP = Test Pit A = Auger V = Vane Test	some 20 to 35%	10-30 Med. Dense	4-8 M/Stiff	Samples 4
UT = Undisturbed Thinwall	and 35 to 50%	30-50 Dense	8-15 Stiff	
		50 + Very Dense	15-30 V-Stiff	HOLE NO. MW-2

East Coast Drilling & Boring of Vermont, Inc.
P.O. BOX 441 • DERBY, VT 05829

Bit # ______ Ftg. ______
Bit # ______ Ftg. ______

TO: Aquatec, Inc.
ADDRESS: S. Burlington, VT
PROJECT NAME: Pecor-Nissan
LOCATION: S. Burlington, VT
REPORT SENT TO: Client
PROJ. NO.:
SAMPLES SENT TO: Taken At Site
OUR JOB NO.: 89V-117

SHEET 1 OF 1
DATE 3-14-89
HOLE NO. MW-4
LINE & STA.
OFFSET

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR.	
At NONE after 0 Hours	Type	HSA	SS		SURFACE ELEV.
	Size I.D.	4 1/4"	1 3/8"		DATE STARTED 2-7-89
At ______ after ______ Hours	Hammer Wt.		140 lb	BIT	DATE COMPL. 2-7-89
	Hammer Fall		30"		BORING FOREMAN Pete Place
					INSPECTOR Brett Cox
					SOILS ENGR.

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler 0-6	6-12	12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
		5.0'-7.0'	D	2	2	7 18	Dry Med Dense		Gray and Brown medium coarse Sand, trace Silt, trace Gravel, trace of odor of Gasoline, trace Clay.	1	2.0'	1.0'
								10.0'				
		10.0'-12.0'	D	2	4	4 18	Moist V.Stiff	12.0'	Brown Gray Silty Clay, trace Sand.	2	2.0'	2.0'
									Bottom of Boring at 12.0' Installed 2" PVC Monitor Well at 10.0' 5.0' Screen 5.0' Riser 5 Bags Ottawa Sand 75 lbs Bentonite Pellets 1-Threaded Plug 1-Vented Cap 1-Curb Box			

GROUND SURFACE TO 10.0' USED HSA "CASING: THEN Sampled to 12.0'

Sample Type	Proportions Used	140 lb Wt. x 30" fall on 2" O.D. Sampler		SUMMARY
D=Dry C=Cored W=Washed	trace 0 to 10%	Cohesionless Density	Cohesive Consistency	Earth Boring 12.0'
UP=Undisturbed Piston	little 10 to 20%	0-10 Loose	0-4 Soft 30 + Hard	Rock Coring
TP=Test Pit A=Auger V=Vane Test	some 20 to 35%	10-30 Med. Dense	4-8 M/Stiff	Samples 2
UT=Undisturbed Thinwall	and 35 to 50%	30-50 Dense	8-15 Stiff	HOLE NO. MW-4
		50 + Very Dense	15-30 V-Stiff	

East Coast Drilling & Boring of Vermont, Inc.

P.O. BOX 441 • DERBY, VT 05829

Bit # ______ Ftg. ______

Bit # ______ Ftg. ______

SHEET	1 OF 1
DATE	3-14-89
HOLE NO.	MW-3
LINE & STA.	
OFFSET	

TO: Aquatec, Inc.
ADDRESS: S. Burlington, VT
PROJECT NAME: Pecor-Nissan
LOCATION: S. Burlington, VT
REPORT SENT TO: Client
PROJ. NO.:
SAMPLES SENT TO: Taken At Site
OUR JOB NO.: 89V-117

GROUND WATER OBSERVATIONS

At 16.0' after 0 Hours

At ______ after ______ Hours

	CASING	SAMPLER	CORE BAR.
Type	HSA	SS	
Size I.D.	4 1/4"	1 3/8"	
Hammer Wt.		140 lb	BIT
Hammer Fall		30"	

SURFACE ELEV.:
DATE STARTED: 2-7-89
DATE COMPL.: 2-7-89
BORING FOREMAN: Pete Place
INSPECTOR: Brett Cox
SOILS ENGR.:

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
		5.0'-7.0'	D	1	2	3 / 4	Moist M.Stiff		Brown and Gray Silty Clay, trace Pebble, trace very fine fine Sand.	1	2.0'	2.0'
		10.0'-12.0'	D	2	2	2 / 1	Moist Soft		" " "	2	2.0'	0.3'
								15.0'				
		15.0'-17.0'	D	2	2	3 / 2	Moist M.Stiff		Gray Brown Silty Clay, trace very fine fine Sand.	3	2.0'	0.5'
								20.0'				
		20.0'-22.0'	D	1	2	5 / 21	Wet V.Stiff		Gray Silty medium coarse Sand, some Clay.	4	2.0'	2.0'
		25.0'-27.0'	D	2	20	57 / 64	Wet Hard	27.0'	" " "	5	2.0'	2.0'
								NO WIM →	Bottom of Boring at 27.0' Installed 2" PVC Monitor Well at 23.0' 10.0' Screen 10.0' Riser 5 bags Ottawa Sand 1-Bag Portland Cement 75 lbs Bentonite Pellets 1-Threaded Plug 1-Vented Cap			

GROUND SURFACE TO 25.0' USED HSA "CASING: THEN Sampled to 27.0'

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency		
0-10	Loose	0-4	Soft	30 + Hard
10-30	Med. Dense	4-8	M/Stiff	
30-50	Dense	8-15	Stiff	
50 +	Very Dense	15-30	V-Stiff	

SUMMARY
Earth Boring 27.0'
Rock Coring
Samples 5

HOLE NO. MW-3

East Coast Drilling & Boring of Vermont, Inc.
P.O. BOX 441 • DERBY, VT 05829

Bit # ______ Ftg. ______
Bit # ______ Ftg. ______

SHEET 1 OF 1
DATE 3-14-89
HOLE NO. MW-1
LINE & STA. ______
OFFSET ______

TO Aquatec, Inc.
PROJECT NAME Pecor-Nissan
REPORT SENT TO Client
SAMPLES SENT TO Taken at Site
ADDRESS S. Burlington, VT
LOCATION S. Burlington, VT
PROJ. NO. ______
OUR JOB NO. 89V-117

GROUND WATER OBSERVATIONS
At 10.0' after 0 Hours
At ______ after ______ Hours

	CASING	SAMPLER	CORE BAR.
Type	HSA	SS	
Size I.D.	4 1/4"	1 3/8"	
Hammer Wt.		140 lb	BIT
Hammer Fall		30"	

SURFACE ELEV. ______
DATE STARTED 3-6-89
DATE COMPL. 3-6-89
BORING FOREMAN Pete Place
INSPECTOR Luxenberg
SOILS ENGR. ______

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From – To	Type of Sample	Blows per 6" on Sampler From To 0-6	6-12	12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
		0.0'-2.0'	D	65	22	22 20	Dry Dense	5.0'	Light Brown fine medium Sand, some Gravel.	1	2.0'	2.0'
		5.0'-7.0'	D	WOR	1	1 1	Wet Soft		Gray and Brown fine medium Sand, trace Silt, trace Clay, trace Gravel.	2	2.0'	0.5'
		10.0'-12.0'	D	WOR	2	1 2	Wet Soft		Gray Brown Silty medium coarse Sand, trace Organic Material, trace Clay.	3	2.0'	1.3'
		15.0'-17.0'	D	2	4	4 6	Moist Stiff	20.0'	Gray Brown Sandy Silt, some Organic Materials, trace Clay, trace Gravel.	4	2.0'	1.3'
		20.0'-22.0'	D	3	5	6 6	Moist Stiff	22.0'	Brown Silty Clay, some medium coarse Sand, trace Gravel.	5	2.0'	1.2'

Bottom of Boring at 22.0'

Installed 2" PVC Monitor Well at 19.0'

10.0' Screen
10.0' Riser
6 Bags Ottawa Sand
50 lb Bentonite Pellets
1-Threaded Plug
1-Vented Cap

GROUND SURFACE TO 20.0' USED HSA " CASING: THEN Sampled to 22.0'

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	M/Stiff
30-50	Dense	8-15	Stiff
50 +	Very Dense	15-30	V-Stiff
		30 +	Hard

SUMMARY
Earth Boring 22.0'
Rock Coring ______
Samples 5

HOLE NO. MW-1

and Whately soils. Any given area may consist of Enosburg soils, Whately soils, or some of both. These soils are depressional to nearly level. They occupy elongated areas, and in a few places the length of the areas is nearly a mile. The areas range from 2 to 150 acres in size. The profiles of the Enosburg and Whately soils are the ones described as representative for the respective series.

Included with these soils in mapping are small areas of very poorly drained soils and soils that have slopes of more than 3 percent. Also included are areas of soils that formed in less than 16 inches of coarse textured or moderately coarse textured materials over finer textured materials. Other included soils have less than 25 inches of coarse textured or moderately coarse textured materials over silty clay loam, silty clay, or clay and intervening strata of silt loam or very fine sandy loam that are thicker than 5 inches. In a few areas the surface layer of the Enosburg soils is sandy loam, fine sandy loam, or loamy fine sand, and that of the Whately soils is sandy loam, loamy sand, or loamy fine sand.

These soils are used mainly for hay and pasture. A few areas are in trees, are idle, or are used for corn.

Overdrainage of the Enosburg soil results in droughtiness. Surface runoff is very slow. Because areas mapped as these soils have more inclusions of wetter soils than areas of steeper Enosburg and Whately soils, tillage is delayed longer in the spring and following heavy rains. The erosion hazard is very slight where these soils are being prepared for seeding or where cultivated crops are grown. These soils have severe limitations for many nonfarm uses, especially those uses for which wetness is a consideration. (Both soils, capability unit IIIw-3; Enosburg soils, woodland suitability group 4w1; Whately soils, woodland suitability group 5w3)

Enosburg and Whately soils, 3 to 8 percent slopes (EwB).—An individual area of this mapping unit may be all Enosburg soils, all Whately soils, or some of both. These soils occupy elongated areas 2 to 40 acres in size.

Included with these soils in mapping are small areas of very poorly drained soils and soils that have slopes of less than 3 percent. Also included are areas of soils formed in less than 16 inches of coarse textured or moderately coarse textured materials over finer textured materials. Other included soils have less than 25 inches of coarse textured or moderately coarse textured materials over silty clay loam, silty clay, or clay and intervening strata of silt loam or very fine sandy loam that are more than 5 inches thick. In a few included areas the surface layer of the Enosburg soils is sandy loam, fine sandy loam, or loamy sand and that of the Whately soils is sandy loam, loamy sand, or loamy fine sand.

These soils are used mainly for hay, pasture, and corn. A few areas are in trees or are idle.

Overdrainage of the Enosburg soil results in droughtiness. Surface runoff is slow. Since areas mapped as these soils have fewer inclusions of wetter soils than areas of more nearly level Enosburg and Whately soils, tillage is not delayed so long in the spring and following heavy rains. The erosion hazard is slight where these soils are being prepared for seeding or where cultivated crops are grown. These soils have severe limitations for many nonfarm uses, especially those uses for which wetness is a consideration. (Both soils, capability unit IIIw-3; Enosburg soils, woodland suitability group 4w1; Whately soils, woodland suitability group 5w3)

Farmington Series

The Farmington series consists of soils that are shallow to bedrock, rocky or extremely rocky, somewhat excessively drained, and loamy throughout their profile. These soils are sloping to steep. They are mainly in scattered areas in the western part of the county. These soils formed in glacial till that contains a considerable amount of limestone. The underlying bedrock is quartzite or limestone (fig. 7). These soils are easy to dig above the hard bedrock. The coarse fragments throughout the soil profile are shale, slate, quartzite, and weathered limestone.

A representative profile of a cultivated Farmington soil has a very dark grayish-brown loam surface layer about 7 inches thick. The upper part of the subsoil is a friable, dark yellowish-brown silt loam about 6 inches thick. The lower part of the subsoil is a friable, dark yellowish-brown loam about 4 inches thick. Bedrock is at a depth of about 17 inches.

The Farmington soils have medium natural fertility and a moderately low available moisture capacity. They are moderately permeable. The bright color of the subsoil indicates that these soils are well aerated most of the time. They are saturated with water during rainy periods in the spring, but the water disappears quickly after the rains stop. Water moves through the soil and flows downslope on the top of the bedrock if the bedrock is not fractured and jointed.

These soils dry out quickly in spring and are ready for planting earlier than most soils in the county. They normally are filled nearly to capacity with available moisture at the start of the growing season. As the growing season progresses, these soils cannot supply the moisture needed by plants during extended dry periods. Plant growth, therefore, is slowed during midsummer. The bedrock restricts plant rooting depth. Shrink-swell potential is low.

Farmington soils are used mainly for hay, pasture, and trees. A small acreage is idle. The limestone bedrock that underlies the Farmington soils is a potential source of lime for crop use and of material for road surfacing (fig. 8).

In Chittenden County, only the extremely rocky Farmington soils were mapped as separate units. The rocky Farmington soils were mapped in complexes with Stockbridge soils. These soils are intermingled in such an intricate pattern that the two could not be separated at the scale of the soil map. A representative profile of the Stockbridge soils is described under the Stockbridge series.

Representative profile of a Farmington extremely rocky loam in a field in the town of Charlotte, approximately 1.7 miles north of East Charlotte and 1,300 feet east of road.

Ap—0 to 7 inches, very dark grayish-brown (10YR 3/2) loam; light brownish gray (10YR 6/2) when dry; moderate, very fine, granular structure; friable; many roots; 10 percent coarse fragments; medium acid; abrupt, smooth boundary.